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CONTRIBUTIONS FROM THE NEW YORK BOTANICAL GARDEN—No. 87

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STUDIES ON THE ROCKY MOUNTAIN  
FLORA—XVII

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By PER AXEL RYDBERG

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## Studies on the Rocky Mountain flora—XVII

PER AXEL RYDBERG

### *Pedicularis siifolia*

Perennial with a rootstock; stem glabrous, 3-6 dm. high, leafy; leaves pinnately divided to the midrib, glabrous, 5-15 cm. long; divisions lanceolate, narrowed at the base, 1-4 cm. long, more or less doubly serrate-dentate; spike short, 3-8 cm. long; bracts linear, oblong, or lanceolate, entire or slightly toothed; calyx glabrous or with a few scattered hairs, 8-9 mm. long, its lobes lanceolate; corolla yellowish, nearly 2 cm. long; galea about 8 mm. long, curved, upper portion helmet-shaped with a short conical beak; lip 4 mm. long, rather deeply 3-cleft with rounded lobes.

This species is somewhat intermediate between *P. Canbyi* and *P. bracteosa*. In habit it resembles closely the latter, but the corolla is that of the former, having an evident although short beak. It grows in the mountains of western Montana and Idaho at an altitude of 600-1200 m.

MONTANA: Grant Creek, June 7, 1897, *M. J. Elrod and assistants* 97.

### *Adenostegia ciliosa*

Annual; stem more or less branched, puberulent, purplish, 1.5-2 dm. high; leaves 2-3 cm. long, finely puberulent, 3-5-cleft into filiform divisions; flowers in small headlike clusters; bracts similar to the leaves but with broader bases and more or less hirsute-ciliate with white flat hairs; calyx nearly 1.5 cm. long, more or less ciliate; its divisions about 5-ribbed; corolla about 15 mm. long; galea 5-6 mm. long, hooded at the apex; lip nearly as long, pubescent without; stamens 4, anthers 2-celled, sparingly short-bearded.

This species is probably most closely related to *A. ramosa* Nutt., but is easily distinguished by the ciliate bracts and calyces. It grows on dry mesas at an altitude of about 2000 m.

WYOMING: Spread Creek, 1897, *Frank Tweedy* 545.

### *Castilleja arcuata*

Perennial, more or less tufted at the base; stems erect, strict, usually simple, 2-4 dm. high, shining, yellow or tinged with

purple, glabrous or short-villous in the inflorescence; leaves narrowly linear, 2-6 cm. long, 1-3 mm. wide, glabrous or the lower sparingly white-villous; bracts brownish, 1-2 cm. long, 3-cleft with lanceolate lobes, white-villous with short hairs; calyx 12-15 mm. long, deeply cleft below, less deeply so above, its lobes lanceolate, about 1 mm. long; corolla 2.5-3 cm. long, at last strongly curved, greenish with yellow margins; galea 12-15 mm. long; lip about 3 mm. long, with linear-lanceolate lobes.

This species is related to *C. cognata* and *C. lunariifolia*. From the former it differs in the color of the bracts, different pubescence and the more arching corolla, from the latter in the color of the bracts, the lower habit and the smaller corolla. It grows in meadow land with alkaline soil.

UTAH: South end of Fish Lake, August 10, 1905, *Rydb. & Carlton* 7508.

### *Castilleja magna*

Perennial; stem a meter or so high, glabrous and shining, angled; leaves lanceolate, 4-6 cm. long, glabrous, 5-ribbed and reticulate, more or less acuminate; inflorescence short and dense; bracts ovate, entire, tipped with crimson, as well as the axis of the inflorescence viscid-ciliate; calyx about 2.5 cm. long, cleft half-way down both above and below, its lobes lanceolate, acuminate, 4-5 mm. long; corolla 4-5 cm. long, greenish, tinged with crimson and with crimson margins; galea fully 2 cm. long; lip about 3 mm. long, its lobes lanceolate.

This species somewhat resembles *C. rhexifolia*, but is a taller plant, with smaller bracts and much larger corolla. The latter is of about the size of that of *C. Suksdorfii*, which however is a much smaller and more pubescent plant and has narrow leaves.

BRITISH COLUMBIA: Trail above Carbonate, 1904, *Charles H. Shaw* 205.

### *Castilleja Leonardi*

Perennial, with a short woody caudex; stems several, 2-3 dm. long, more or less viscid-villous; leaves ovate-lanceolate or oblong-lanceolate, 1.5-3 cm. long, densely puberulent, 3-ribbed, acute or acuminate; bracts broadly ovate or obovate, rounded at the apex, about equaling the flowers, densely pubescent, entire, tipped with crimson; calyx 1.5 cm. long, densely puberulent, equally cleft above and below, its lobes ovate, 1.5-2 mm. long, obtuse; corolla 2 cm. long or less, densely puberulent; galea about 1 cm. long; lower lip about 2 mm. long, its lobes lanceolate.

This species is related to *C. lauta* and *C. rhexifolia*. From the former it differs in the broad leaves and dense pubescence, and from the latter in the small size of both the plant and the flower, the thick leaves and more copious pubescence.

UTAH: Head of American Fork Cañon, 1885, *F. E. Leonard* 151 in part (type); mountains around the south fork of Big Cottonwood Creek, 1905, *Rydberg & Carlton* 6592.

### *Castilleja humilis*

Perennial, with a short woody caudex; stems several, about 2 dm. high, glabrous below, somewhat viscid-pubescent above; leaves oblong to elliptic-lanceolate or the uppermost ovate, 2–3 cm. long, obtuse or acute, finely puberulent; bracts entire, obovate, tipped with dark crimson, a little shorter than the corollas; inflorescence short and dense; calyx densely puberulent, 10–12 mm. long, equally cleft above and below, its lobes ovate, obtuse, about 1.5 mm. long; corolla about 15 mm. long, densely puberulent, greenish with purple margins; galea 7–8 mm. long; lip 2 mm. long, its lobes lanceolate, acuminate.

In habit this species most resembles *C. rhexifolia*, but the plant is much smaller and the corolla of about half the size. It grows in alpine woods.

WYOMING: Medicine Bow Mountains, Albany County, 1900, *Aven Nelson* 7919.

### *Castilleja variabilis*

Perennial with a rootstock; stems usually single, more or less pubescent, 4–8 dm. high; leaves linear-lanceolate or lanceolate, 4–6 cm. long, 3-ribbed, puberulent and more or less short-hirsute, rarely glabrous; bracts lanceolate, deeply 3-cleft, greenish at the base, otherwise yellow with scarlet or brick-red tips or sometimes almost wholly brick-red; calyx viscid-villous, about 2.5 cm. long, tinged with yellow; corolla yellowish-green with scarlet or yellow margin, about 4 cm. long; galea nearly 2 cm. long; lip dark-green, 3 mm. long, with lanceolate lobes.

This species somewhat resembles *C. lanceolata*, but has larger flowers and differently colored bracts. These are nearly of the same color as those of *C. lutescens* and *C. desertorum*, but both of these species have smaller flowers and 3-cleft upper leaves. *C. variabilis* grows in mountain valleys and on hillsides, at an altitude of 2500–3000 m.

UTAH: Big Cottonwood Cañon, below Silver Lake, 1905,

*P. A. Rydberg* 6773 (type) and 6800; divide between Big Cottonwood Cañon and Heber Valley, 1905, *Rydberg & Carlton* 6646; Big Cottonwood Cañon, 1905, *A. O. Garrett*, 1504.

### *Castilleja Vreelandii*

Perennial with a rootstock; stem usually single, 6–8 dm. high, glabrous or nearly so, shining; leaves lanceolate, 3–5-ribbed, glabrous or nearly so, 4–6 cm. long, somewhat acuminate; bracts lanceolate, usually 3-lobed with acute lobes, tipped with crimson; calyx 2–2.5 cm. long, tinged with crimson, equally cleft, viscid-villous below, puberulent above, its lobes lanceolate, acute, 6–8 mm. long; corolla dark-green with purplish margins; galea about 2 cm. long; lower lip 2 mm. long, with lanceolate teeth.

This species is related to *C. lanceolata*, but differs in the larger flowers and the broader, almost glabrous leaves. It grows in the mountains from Montana and Idaho to Wyoming and Utah. As the type is regarded the following:

MONTANA: Divide between McDonald and Camas Lakes, 1901, *F. K. Vreeland* 1000.

### *Castilleja purpurascens*

Perennial with a short caudex; stems several, 1–3 dm. high, glabrous or slightly puberulent, villous above, usually dark-purple; leaves narrowly linear, finely puberulent, 3–5 cm. long, 2–3 mm. wide; inflorescence short and dense; bracts lanceolate, acute or obtuse, the lower usually entire, the upper more or less cleft, tipped with crimson; calyx 15–20 mm. long, more or less villous, especially towards the base, equally cleft, its lobes 2–3 mm. long, obtuse; corolla 2.5–3 cm. long, green with crimson margins; galea about 1 cm. long; lower lip 3 mm. long, with narrowly lanceolate lobes.

This is probably most closely related to *C. Tweedyi* and *C. miniata*, but differs in the lower habit, the darker coloration of the bracts, the narrow leaves, obtuse calyx-lobes, and usually purplish stem.

BRITISH COLUMBIA: Flood-plains of Kicking Horse, 1904, *H. Peterson* 11 (type).

ALBERTA: National Park, Banff, 1897, *Mr. & Mrs. C. Van Brunt* 40; Pipestone Pass, 1904, *J. Macoun* 67803.

### *Castilleja viscida*

Cespitose perennial with a short woody caudex; stems 1–3 dm. high, viscid- or glandular-puberulent and with scattered crisp

white hairs; leaves 1.5–3 cm. long, 3–5-cleft at the middle, densely glandular-puberulent, the body lanceolate, 3-ribbed, the lobes narrowly lanceolate and directed forward; bract similar to the leaves, tipped with crimson or scarlet; calyx equally deeply cleft above and below, 18–20 mm. long, its lobes lanceolate, 5 mm. long, acuminate or acute; corolla about 2.5 cm. long, dark-green, with crimson margin; galea about 1 cm. long; lip 3 mm. long, its lobes lanceolate.

This species is related to *C. hispida*, *C. Bradburyi* and *C. rupicola*. From the first two it differs in the lower habit and viscid or glandular pubescence, and from the last one in the shorter galea. It grows in the mountains among rocks at an altitude of 2700–3300 m.

UTAH: Mountains near the headwaters of Big Cottonwood Creek, 1905, *Rydberg & Carlton 6593* (type), *6565*, *6540*, *6554*, *6635* and *6546*; Mount Nebo, *no. 7703*, *7750* and *7755*.

### Castilleja ampliflora

Perennial, caespitose and somewhat woody at the base; stems 3–4 dm. high, usually branched, ascending, puberulent and somewhat villous; most of the leaves entire, lanceolate, 2–3 cm. long with a short and rather dense pubescence; the upper 3–5-lobed, the middle lobe being broad and the lateral ones small; bracts 3-lobed with a broad rounded middle lobe, crimson, 1–1.5 cm. long; calyx 1.5–2 cm. long, villous, equally cleft above and below, its lobes 3–4 mm. long; corolla nearly 3 cm. long, more turgid than usual; galea fully 1.5 cm. long; lip 3 mm. long, with lanceolate lobes.

This is perhaps most closely related to *C. Bradburyi*, but the stems are more branched, the corolla more turgid, the leaves more inclined to be entire, and the galea fully as long as the corolla-tube. It grows at an altitude of 1150–1350 m.

MONTANA: Divide between McDonald and Camas Lakes, July 29, 1901, *F. K. Vreeland 995*.

### Castilleja gracillima

Perennial with a rootstock; stems usually solitary, slender, purplish, 2–4 dm. high, sparingly villous; leaves linear-lanceolate, 2–4 cm. long, 3-ribbed, sparingly short-villous; bracts ovate, entire, toothed or 3-cleft, rose or brownish, puberulent, villous-ciliate; calyx about 15 mm. long, equally cleft above and below, its lobes lance-oblong, obtusish, 3 mm. long; corolla purplish,



slightly longer than the calyx; galea 8 mm. long; lip about 3 mm. long, its lobes ovate.

This species is closely related to *C. pallida*, but differs in the leaves, which are shorter, neither long-attenuate nor falcate, and in the different color of the bracts and corolla.

In mountain meadows especially on the geyser formations at an altitude of 2000–2700 m.

WYOMING: Lower Geyser Basin, Yellowstone Park, 1897, *Rydberg & Bessey 4964* (type); Lone Star Geyser Basin, *no. 4961*; Upper Hoback Basin, 1900, *C. C. Curtis*.

MONTANA: Mountains near Indian Creek, 1897, *Rydberg & Bessey 4967*.

ALBERTA: Vicinity of Banff, 1899, *W. C. McCalla 2187*.

### *Castilleja parvula*

Cespitose perennial with a short caudex; stems many, 5–15 cm. high, puberulent; leaves lanceolate, 1–2 cm. long, puberulent; bracts ovate, dark brownish-crimson, finely puberulent, entire or with short lobes; calyx 12–14 mm. long, puberulent, equally cleft above and below, its lobes oblong, obtuse, 2–3 mm. long; corolla 17–18 mm. long, greenish with purplish margins; galea about 7 mm. long; lip 2.5–3 mm. long, its lobes lanceolate.

This species is closely related to *C. occidentalis*, but differs in the bracts, which are darker, of a deep crimson shade and not at all villous, and also in the corolla, which is decidedly greenish and with a shorter lip. It grows among rocks on high mountains, at an altitude of nearly 3000 m.

UTAH: Mountains north of Bullion Creek, near Marysvale, 1905, *Rydberg & Carlton 7158* (type) and 7090.

### *Castilleja pulchella*

Perennial with a cespitose caudex; stems 5–15 cm. high, ascending, more or less villous especially above; leaves 1–4 cm. long; the lower entire and linear-lanceolate, the upper broader and 3-cleft, puberulent and slightly villous; lobes linear-lanceolate, attenuate; bracts elliptic, usually 3-cleft, the middle lobe broad and rounded, tinged with brownish, villous; calyx yellowish, tipped with brownish, about 18 mm. long; lobes very short and rounded; corolla slightly exserted; galea 7 mm. long; lip 5 mm. long, its lobes lanceolate, obtuse.

This species is intermediate between *C. lutea* and *C. occidentalis*.



It has the habit, pubescence and coloration of the latter but the leaves, bracts and calyx-lobes of the former; the form of the corolla is intermediate between those of the two. *C. pulchella* grows on high mountains at an altitude of 2500–3300 m.

MONTANA: Mountains near Indian Creek, 1897, Rydberg & Bessey 4967 (type); Electric Peak, no. 4968.

WYOMING: Big Horn Mountains, 1899, Tweedy 2345; Dome Lake, 1896, Aven Nelson 2435; Teton Forest Reserve, 1897, Tweedy 247.

### Castilleja Pecten

Perennial; stem stout, 4–5 dm. high, puberulent throughout; lower leaves linear, entire, 5–6 cm. long, puberulent; the upper 3–5-cleft with linear divisions; bracts rhombic-obovate or broadly cuneate in outline, almost pectinately cleft into linear divisions, puberulent, upper portion yellowish or the tips brownish; calyx about 2 cm. long, puberulent, equally cleft above and below; lobes lanceolate, about 3 mm. long; corolla a little over 2 cm. long; galea 8–9 mm. long; lip about 4 mm. long, its lobes oblong.

In general habit and coloration it resembles somewhat *C. desertorum* and *C. lutescens*, but the lower lip is nearly half as long as the galea and of different shape, and the bracts are peculiar. The structure of the corolla places this species nearest to *C. fasciculata*, but it is a much larger plant.

IDAHO: Beaver Cañon, 1895, *C. L. Shear* 3041 (type) and 3038.

### Lupinus marianus

Stem 5–10 dm. high, striate, hirsute-villous with rather short hairs, slender, leafy; stipules setaceous; petioles 4–8 cm. long, or those of the basal leaves even 2 dm. long, hirsute-villous; leaflets 6–8, narrowly oblanceolate, 3–7 cm. long, acute, glabrous above, appressed, short-hairy beneath; inflorescence lax, 1–1.5 dm. long; pedicels 4–5 mm. long; calyx villous, gibbous but not spurred at the base on the upper side; lips lanceolate, the upper 7 mm., the lower 8 mm. long; bracts linear-subulate, longer than the calyx, deciduous; banner 8–10 mm. long, light-blue or white with a darker spot; wings light-blue or white, 10–12 mm. long; legume 3–4 cm. long, 8–9 mm. wide, densely pubescent.

In habit resembling *L. pseudoparviflorus* and *L. laxiflorus*, but differing in the spreading pubescence of the stem. This character would associate it with *L. amplus* and *L. ornatus glabratus* S. Wats. From the former it differs in the lax spike, slender stem,

and the paler and smaller corolla ; from the latter in the long linear-subulate bracts and narrow leaflets.

UTAH: Along Bullion Creek, above Marysvale, July 21, 1905, Rydberg & Carlton 7024 (type) and 7025.

### **Lupinus stenophyllus** (Nutt.)

*Lupinus foliosus stenophyllus* Nutt. ; T. & G. Fl. N. Am. 1 : 377 (synonym). 1840.

Stem slender, probably 1 m. high, finely silky-strigose ; stipules small, subulate ; petioles of the stem-leaves about 3 cm. long, strigose ; leaflets about 5, narrowly linear-oblanccolate, about 3 cm. long, 4 mm. wide, usually conduplicate, acute, green, glabrous above, sparingly silky-strigose beneath ; raceme about 1 dm. long, lax, more or less one-sided ; bracts lanceolate, shorter than the calyx, deciduous ; calyx densely silky-strigose, more or less spurred at the base ; upper lip ovate, 4 mm. long, the lower lanceolate, 6 mm. long ; corolla light-blue, 7-8 mm. long ; banner slightly shorter than the broad wings ; fruit unknown.

This species has been included in *L. laxiflorus* and *L. tenellus*. It resembles the latter in habit but differs in the spurred calyx and green leaves. From the former it differs in the narrower leaves, glabrous above, and the smaller flowers. The type was collected on the "Oregon Plains" by Nuttall.

### **Lupinus laxispicatus**

Perennial ; stems 3-4 dm. high, slender, striate, sparingly strigose ; stipules small, lanceolate ; petioles strigose, 5-15 cm. long ; leaflets 7-10, narrowly oblanceolate, acute, green, glabrous above, strigose beneath, 4-5 cm. long, about 6 mm. wide ; inflorescence lax, rather few-flowered ; bracts lanceolate, shorter than the calyx, deciduous ; calyx grayish silky-strigose, gibbous ; lips lanceolate, the upper 6 mm., the lower 7 mm. long ; corolla blue, about 10 mm. long ; banner only slightly shorter than the wings.

This species is nearest related to *L. Scheuberae*, which however has broader leaves, larger flowers and the upper lip of the calyx is ovate and much shorter than the lower. *L. laxispicatus* grows on high mountains.

IDAHO: Kootenai County, July, 1887, J. H. Sandberg.

### **Lupinus Macounii**

Perennial with a short caudex ; stems several, 3-6 dm. high, silky-strigose, somewhat branched ; stipules lance-subulate ; petioles

2-5 cm. long, strigose; leaflets about nine, linear-oblongate, 2-3 cm. long, usually conduplicate, silky-strigose on both sides; racemes dense, 5-10 cm. long; bracts narrowly lanceolate, not exceeding the buds, deciduous; calyx gibbous at the base, short-silky with spreading hairs; lower lip lanceolate, 6-7 mm. long, the upper hardly 4 mm. long, ovate; corolla 8-9 mm. long, dark-blue, the banner with a lighter spot, somewhat shorter than the wings; legume densely silky, villous, about 2 cm. long, 6 mm. broad, 3-4-seeded.

The type was labeled *L. argenteus argophyllus*. Its relationship is closer however to the true *L. argenteus*, differing in the smaller, darker flowers, the spreading pubescence on the calyx and pedicels and above all in the shorter upper lip of the calyx. It grows at an altitude of 1000-2500 m.

SASKATCHEWAN: Cypress Hills, 1894, *John Macoun 4070* (type in herb. Columbia Univ.).

MONTANA: Spanish Peaks, 1896, *Flodman 629* (in part).

WYOMING: Big Horn Mountains, 1899, *Twedy 2363*; Leckie, 1901, *Merrill & Wilcox 759*.

### *Lupinus subulatus*

Perennial with a short caudex; stem 4-5 dm. high, densely silky-strigose, striate, leafy; stipules subulate; petioles silky-strigose, 3-6 cm. long; leaflets 7-10, narrowly oblongate or linear-oblongate, densely appressed, silky on both sides, 2-4 cm. long, cuspidate or mucronate; raceme dense, 1-1.5 dm. long; bracts subulate-setaceous, much exceeding the buds; calyx appressed silky-canescens, scarcely gibbous; lower lip 8 mm. long, narrowly lanceolate, the upper ovate-lanceolate, 6 mm. long; corolla dark-blue with keel and a spot on the banner light-colored, about 1 cm. long; petals subequal, banner rather densely pubescent without.

This is related to *L. holosericeus*, *L. canescens*, and *L. oreophilus*, but easily distinguished by the long subulate-setaceous bracts.

MONTANA: Columbia Falls, June 3, 1897, *R. S. Williams* (type).

WASHINGTON: Spokane, 1898, *Piper 2823*; also 1892, *Henderson*.

### *Lupinus flavicaulis*

Perennial with a short caudex; stems several, with erect branches, densely pubescent with short yellowish spreading hairs, almost velutinous, 3-5 cm. high; stipules subulate; petioles 2-4

cm. long, velutinous; leaflets 7-10, narrowly oblanceolate, usually conduplicate, densely silky on both sides, acute, 2-4 cm. long; racemes dense, 5-10 cm. long; bracts subulate, shorter than the buds; calyx gibbous, villous; lower lip lanceolate, 7 mm. long; upper lip ovate, 5-6 mm. long; corolla about 10 mm. long, light-purple or pink; banner with a darker spot, pubescent without, legume 2-2.5 cm. long, 7 mm. wide, densely silky-villous, 3-4-seeded.

In general habit, size, form, and color of the corolla and leaflets, this resembles *L. decumbens* very closely, but differs in the dense, short, spreading pubescence of the stem and the denser, longer, looser pubescence of the leaves. These characters place it in the same group as *L. Bakeri* and *L. dihyous*, which it otherwise little resembles. It grows on dry plains and hills.

WYOMING: Snake River, 1894, *Ivan Nelson 1098* (type in herb. Columbia Univ.); Evanston, 1882, *N. L. Britton*.

UTAH: Divide, 1898, *Isabel Mulford 268*.

### **Lupinus macrostachys**

Perennial with a short caudex; stem 5-10 dm. high, puberulent and with long silky spreading or reflexed hairs; stipules setaceous; petioles short-pubescent with spreading hairs, 2-10 cm. long; leaflets 7-8, linear-oblanceolate, acuminate, 3-6 cm. long, appressed-silky on both sides, grayish-green; raceme dense, 2-3 dm. long; bracts lanceolate, acuminate, merely equaling the buds; calyx velutinous, gibbous; lower lip broadly lanceolate, obtuse, about 8 mm. long; upper lip ovate, almost as long; corolla 10-12 mm. long, dirty-white, tinged with blue; banner with a darker spot; legumes fully 2 cm. long, densely silky-villous, 4-5-seeded.

This species is related to *L. leucophyllus*, from which it differs in the less dense and strictly appressed silky pubescence (scarcely canescent) and the color of the flowers. In *L. leucophyllus* they are rather light-blue or pink with darker striations (rarely white), the banner with a lighter spot. It grows at an altitude of about 1000 m.

MONTANA: Jocko Creek, 1901, *D. T. MacDougal 253* (type in herb. N. Y. Bot. Gard.).

### **Lupinus roseolus**

Perennial with a caespitose caudex; stems ascending or decumbent, about 1 dm. high, sparingly strigose, 3-5-leaved, slender;

stipules setaceous; petioles 1–3 cm. long, slender, usually red-tinged; leaflets about 7, narrowly linear-oblongate, acute, 1–2 cm. long, sparingly silky, short-strigose; raceme 2–4 cm. long; bracts subulate, shorter than the buds; calyx gibbous, silky with short spreading hairs; lips broadly lanceolate, subequal, 5–6 mm. long; corolla nearly white, tinged with rose, about 8 mm. long; pod densely silky, perhaps 1.5 cm. long when fully developed.

This resembles *L. argenteus* in the form and color of the flowers. It has also the peculiar hue and pubescence of that species, but it is a much smaller plant and of a different habit. The latter will place it near *L. Lyallii*. It is an alpine plant growing at an altitude of 3000 m.

WYOMING: Continental Divide, Buffalo Fork, August 1897, *F. Tweedy* 270.

### ***Lupinus scaposus***

Annual, with sessile clasping cotyledons; stem branched at the base, 1–1.5 cm. high, sparingly ciliate; stipules lanceolate, acuminate; petioles 3–5 cm. long, ciliate, slender; leaflets about 7, spatulate, 1 cm. long, sparingly silky-hirsute on both sides or glabrous above; peduncles longer than the leaves, ciliate; raceme short, 1–4 cm. long; bracts lanceolate, short; calyx ciliate, the lower lip broadly lanceolate, entire, 5 mm. long, the upper 2-cleft, ovate; corolla purplish, 6 mm. long, paler at the base; banner shorter than the wings; legume ciliate, 1 cm. long, 6 mm. wide, 2-seeded.

In habit mostly resembling *L. brevicaulis* but more evidently caulescent, with longer peduncles. The most distinctive characters, however, are the different calyx and its entire lower lip. This associates it with *L. pusillus*, from which it differs in the long peduncles and smaller flowers.

COLORADO: Glenwood Springs, 1899, *Geo. E. Osterhout*.

### ***Lupinus rubens***

Annual, with sessile, clasping cotyledons; stem ciliate, tinged with red, branched near the base, about 1 dm. high; petioles densely ciliate, 2–4 cm. long; leaflets 6–7, spatulate, 1–1.5 cm. long, ciliate on both sides or glabrous above, acute; raceme lax, 5–10 cm. long, overtopping the leaves; bracts minute, subulate; calyx ciliate, the lower lip lanceolate, 5 mm. long, the upper barely 3 mm. long; corolla 7 mm. long; banner dark-purple with a yellow spot; wings and keel lighter, tinged with lilac.

This species is related to *L. pusillus*, but differs in the more elongated racemes, which much exceed the leaves, the smaller flowers of a different color and the short upper lip of the calyx.

UTAH: Southern Utah, 1874, *Parry 41* (type in herb. Columbia Univ.); St. George, 1877, *Palmer 86*.

### *Trifolium confusum*

Perennial with a rootstock; stems erect, simple, 2-3 dm. high, glabrous below, sparingly strigose above; stipules ovate, acute, about 2 cm. long, glabrous, veiny; leaflets of the lower leaves oval and rounded at the apex, of the upper ones lanceolate, and acute, 2-3 cm. long, finely denticulate, glabrous or nearly so; peduncles 5-7 cm. long; head globose; flowers reflexed in fruit; calyx-tube 2 mm. long, glabrous except the villous margin; teeth villous, 4-5 mm. long, subulate-setaceous; corolla rose or purplish, 13-15 mm. long; ovary 4-ovuled; legume sparingly hairy, stipitate.

This species belongs to the *T. longipes* group. It is probably most nearly related to *T. Rydbergii* and *T. pedunculatum*. From the former it differs in the nearly glabrous calyx-tube and the rose-colored and larger corollas; from the latter in the larger and reflexed flowers. It differs from *T. longipes* and *T. Rusbyi* in its different habit and nearly glabrous calyx.

SOUTHERN UTAH: 1874, *C. C. Parry 35* (type in herb. Columbia Univ.).

### *Trifolium Aitonii*

Perennial with a rootstock; stem 3-4 dm. high, glabrous below, strigose above; stipules ovate, short-acuminate, about 2 cm. long, veiny; leaflets ovate, thin, obtuse or rounded and mucronate at the apex, finely denticulate, 2-4.5 cm. long, glabrous above, sparingly hairy beneath; peduncles several, 1-2 dm. long; heads globose; flowers reflexed in fruit on pedicels 2-3 mm. long; calyx pubescent throughout; tube 2 mm. long; teeth subulate, about 4 mm. long; corolla about 12 mm. long; legume stipitate, strigose, about 2-seeded.

This species is related to *T. latifolium*, from which it differs mainly in the different habit, larger size, longer peduncles and larger ovate instead of oval or obovate leaflets.

IDAHO: Palouse County, 1892, *G. B. Aiton 65* (type in herb. N. Y. Bot. Gard.).



**Trifolium uintense**

*Trifolium dasyphyllum* S. Wats. Bot. King Exp. 60, in part. 1871.

Not *T. dasyphyllum* Torr.

Cespitose, subacaulescent perennial; stipules large and scarious; petioles 1-4 cm. long, sparingly strigose; leaflets oblanceolate, broadest above the middle, acute and mucronate, entire, 1-2 cm. long, sparingly pubescent or glabrate above; peduncle about 6 cm. long, sparingly strigose; head obovate, rather few-flowered; bracts lanceolate, 5-8 mm. long, 3-nerved, slightly if at all scarious-margined; calyx only slightly pubescent; tube 2.5 mm. long; teeth subulate-setaceous, about 7 mm. long; corolla purple, about 15 mm. long; ovary pubescent, about 6-ovuled.

This is a member of the *T. dasyphyllum* group, but differs from its relatives in the broader, decidedly oblanceolate leaflets and the 3-nerved bracts.

UTAH: Uintas, 1869, *S. Watson 241* (type in herb. Columbia Univ.).

**Trifolium inaequale**

Cespitose glabrous perennial, with very short stems; stipules ovate, short-acuminate, about 1 cm. long; petioles 3-10 cm. long, glabrous; leaflets oblanceolate or oblong, acute or obtuse, minutely denticulate, rather fleshy, 1.5-3 cm. long; peduncles 1-2 dm. long; heads sub-globose; bracts ovate or lanceolate, 5-7 mm. long, usually shorter than the calyces, usually cleft or toothed at the apex; calyx glabrous; tube 3 mm. long; teeth unequal, the upper 2-2.5 mm., the lower 3.5-4 mm. long, lance-subulate; corolla purple, about 1.5 cm. long; ovary 4-ovuled; legume glabrous, stipitate.

This is related to *T. Parryi* and *T. montanense*. From the former, it differs in the decidedly unequal calyx-teeth, the narrower and smaller, ovate instead of obovate, bracts and stipules, and the less sharply denticulate leaflets; from the latter in the larger size and the ovate instead of obovate bracts.

UTAH: Bear River Cañon, 1869, *S. Watson 243* (type in herb. Columbia Univ.); Dyer Mine, Uintah Mountains, 1902, *Goodding 1244*.

**Tium variegatum**

Perennial with a taproot and short cespitose caudex; stems numerous, strigose, more or less mottled with purplish-brown; stipules triangular or deltoid, 4 mm. long, distinct; leaves 5-8 cm. long; leaflets obovate to nearly orbicular, rounded or retuse



at the apex, thick, sparingly strigose, soon glabrate, 5-10 mm. long; peduncles 4-7 cm. long; raceme short, 1-2 cm. long, in fruit 3-6 cm. long, 5-15-flowered; calyx black-hairy; tube 2-2.5 mm. long; teeth subulate, 1-2 mm. long; corolla ochroleucous; banner 6-7 mm. long; wings and keel 5 mm. long; pod scarcely stipitate, about 2 cm. long, 4 mm. broad, oblong, tapering at both ends, slightly arcuate, sulcate on the lower suture except at the ends, acute on the upper suture, mottled with purplish-brown and minutely strigose.

This is perhaps most nearly related to *T. sparsiflorum* (A. Gray) Rydb., but is a much larger and coarser plant. The latter species has usually smaller leaves, smaller corolla, white and tinged with violet, strongly oblique calyx and pods of about half the length, more curved and more distinctly stipitate.

COLORADO: Platte Cañon, May 19, 1894, State Agricultural college, Colorado, distribution *no. 15* (type in herb. N. Y. Bot. Garden).

#### *Hamosa atratiformis*

Perennial; stem 2-3 dm. high, erect, branched, strigose; stipules triangular, strigose, 1-2 mm. long; leaves 3-5 cm. long; leaflets 13-19, oblong, strigose below, glabrous above, 4-6 mm. long; peduncles 5-7 cm. long; raceme lax, 2-3 cm. long; calyx black-strigose; tube about 2 mm. long; teeth subulate, 1 mm. long; corolla ochroleucous, about 7 mm. long; pod linear, straight, minutely strigillose.

This is closely related to *H. atrata* (*Astragalus atratus* S. Wats. Bot. King Exp. 69. 1871), but differs in the short leaves and the smaller flowers, which are scarcely more than half as long as in that species.

SOUTHERN UTAH: \*1874, *C. C. Parry 47* (type in herb. Columbia Univ.).

#### *Xylophacos aragalloides*

Cespitose perennial; stems 1 dm. or less long, decumbent at the base, densely white-strigose; stipules scarious, strigose, triangular, with a subulate acumination, 5-8 mm. long; leaves 10-15 cm. long; leaflets 11-19, lanceolate to elliptic, silky-canescant, 5-12 mm. long, acute; peduncles about 1 dm. long; raceme short, 4-10-flowered; calyx ascending, strigose with black and white hairs; tube cylindric, about 8 mm. long; teeth subulate, 3-4 mm. long; corolla purplish, about 2 cm. long; legume lunate, about 4 cm. long, tapering at both ends, rather deeply sulcate be-

low, transversely reticulate, sparingly strigose; upper suture prominent.

This species is related to *X. amphioxys* (A. Gray) Rydb., but differs in the long subulate instead of triangular calyx-teeth, in the banner much exceeding the wings, and in the narrower leaflets.

UTAH: St. George, 1880, *M. E. Jones 1633* (type in herb. Columbia Univ.); 1877, *Dr. E. Palmer 101*.

### **Homalobus uniflorus**

Pulvinate-cespitose perennial with a much-branched caudex; stipules ovate, scarious, ciliate; leaves reduced to oblanceolate or linear-spatulate phyllodia, appressed silky-canescens, 1-2 cm. long, 1-3 mm. wide; peduncles 1-2 cm. long, usually 1-flowered; calyx silky-canescens; tube campanulate, 2 mm. long; teeth subulate, of about the same length; corolla dark bluish-purple, 8 mm. long.

This species is closely related to *H. simplicifolius* and *H. brachycarpus* Nutt. From the former it differs in the dark bluish-purple, not ochroleucous corolla; the elongated peduncles, the longer and broader leaves, and the comparatively longer calyx-lobes; from *A. brachycarpus* it is distinguished by its solitary flowers and darker corolla.

WYOMING: Evanston, 1897, *Aven Nelson 2971* (type in herb. N. Y. Bot. Gard.).

HOMALOBUS CAMPESTRIS Nutt.; T. & G. Fl. N. Am. 1: 351. 1838. *Astragalus campestris* A. Gray, Proc. Am. Acad. 6: 229, in part. 1866. Not *Astragalus campestris* L. 1753.

*Astragalus convallarius* Greene, Erythraea 1: 207. 1893.

There has been a confusion concerning the identity of this species, evidently because Dr. Gray, when he transferred the species to *Astragalus*, had in mind something entirely different from Nuttall's *Homalobus campestris*. All the specimens of this species (except the type and one more) in the herbaria of the New York Botanical Garden and Columbia University have been referred to *H. junceus*. *H. campestris* is also closely related to that species, differing in the black-hairy calyx, the longer calyx-lobes, and the pod, which tapers gradually to the base. The black-hairy calyx and the shape of the pod it has in common with *Homalobus junciformis* (A. Nelson) Rydb., but it has longer calyx-teeth and narrower and longer leaflets. In both *H. junceus* and *H. junciformis*

the calyx-teeth are triangular, about as broad as long. All three species have rootstocks, or a deep-set root and the stems branching below ground, the corollas are ochroleucous, the keel curved from near the base and without any purple. What Dr. Gray and many later writers regarded as *Astragalus campestris* is a combination of several species characterized by a caespitose caudex or strongly-branched rootstocks, white, pink- or purple-tinged corollas, and the keel curved only at the tip and with a dark-purple tip. The aggregate consists of *Homalobus decurrens* Rydb., *H. hylophilus* Rydb., *H. tenuifolius* Nutt., *H. divergens* Blankinship (*H. camporum* Rydb.), and other species.

The range of *H. campestris* seems to be limited to Wyoming, northern Colorado and northeastern Utah.

### ***Homalobus oblongifolius***

*Homalobus hylophilus* Rydb. Bull. Agr. Exp. Sta. Colo. 100 : 210, in part. .1906.

Perennial with a caespitose caudex ; stems ascending, branched, 2-3 dm. high, glabrous or nearly so ; stipules ovate, scarious, 4-5 mm. long ; leaves 8-10 cm. long ; leaflets 11-19, usually oblong, but varying from elliptic to linear-oblong, 1-2 cm. long, 3-6 mm. wide, glabrous above, sparingly strigose beneath, rounded at the apex ; peduncles 5-10 cm. long ; raceme short, 3-5 cm. long, 5-10-flowered ; bracts lanceolate, scarious, 1 mm. long ; calyx strigose with black hairs ; tube campanulate, 2-2.5 mm. long ; teeth subulate, fully 1 mm. long ; corolla 1 cm. long, white, tinged with purple ; keel with a narrow dark-purple tip ; legumes 2-2.5 cm. long, strigose, 4 mm. wide ; the lower suture strongly curved, the upper straight or slightly upturned towards the apex.

This species was included in *H. hylophilus* in my Flora of Colorado, *i. e.*, as far as the Colorado specimens are concerned. It resembles *H. hylophilus*, but the leaflets are thicker and the pod decidedly strigose and of another shape. In *H. hylophilus* the legume is straight and glabrous from the beginning. *H. oblongifolius* is found as far as known only in the mountains of Colorado, while *H. hylophilus* belongs to Montana, northern Wyoming and Idaho.

COLORADO : Cerro Summit, 1901, *Baker 409* (type) ; Leadville, 1884, *M. E. Jones* ; North Park, near Teller, 1884, *C. S. Sheldon 108* ; Marshall Pass, *M. E. Jones*.



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